

# Draft Metals TMDL Los Angeles River



Los Angeles Regional Water Quality Control Board

September 9, 2004

Melinda Becker

Presented at the Southern California Association of Governments  
Water Policy Task Force Meeting



# Metals TMDLs

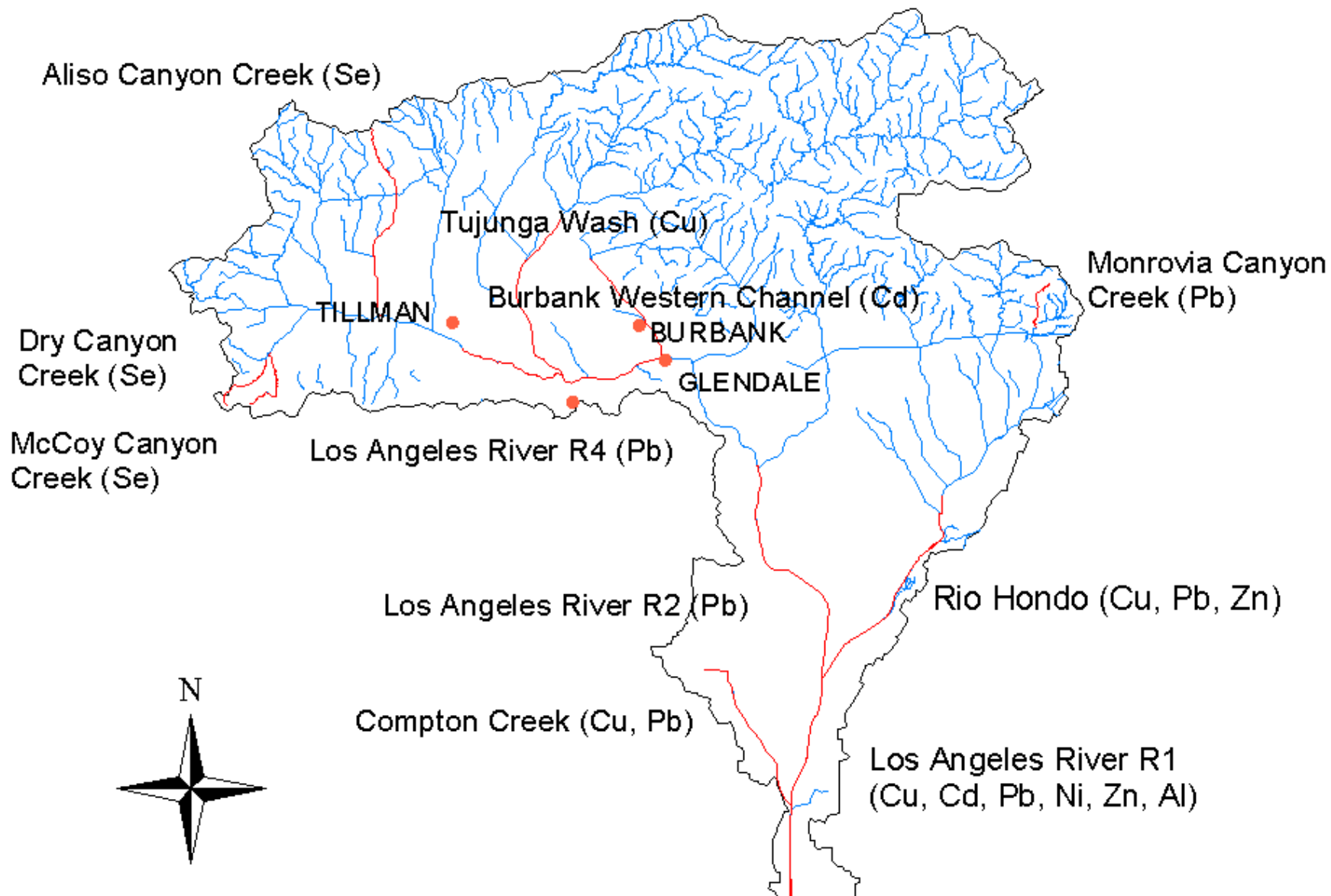
- ❧ Water Column Toxicity
- ❧ Ballona Creek and Estuary Toxic Sediment TMDL scheduled for release this week
- ❧ L.A. Harbor Toxic Sediment TMDL
- ❧ Waste load allocations in terms of concentration and loadings
- ❧ Allocations derived from the California Toxics Rule



# TMDL Elements

- ✿ TMDL= Numeric Target \* Critical flow + MOS
- ✿ TMDL developed for Dry Weather and Wet Weather

# LA River Impaired Reaches



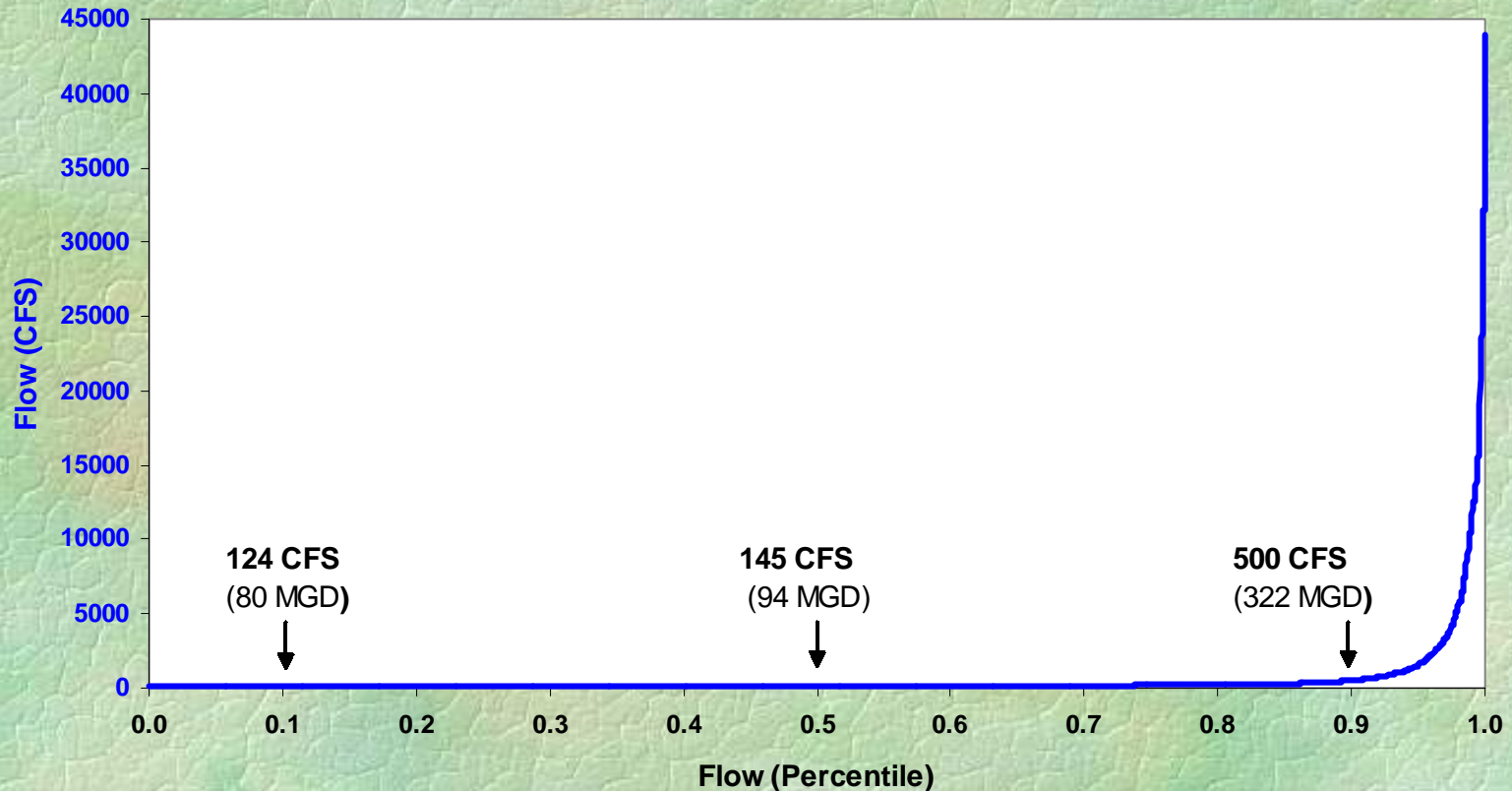
# Los Angeles River Metals Listings

Waterbody	Cu	Cd	Pb	Zn	Al	Se
Aliso Canyon Creek						X
Dry Canyon Creek						D
McCoy Canyon Creek						D
Monrovia Canyon Creek			X			
Los Angeles River (R4)			X			
Tujunga Wash	X					
Burbank Western Channel		X				
Los Angeles River (R2)			X			
Rio Hondo	X		X	X		
Compton Creek	X		X			
Los Angeles River (R1)	D	D	X	D	X	
LA Estuary			X	X		
San Pedro Bay	X			X		



# Defining dry-weather and wet-weather conditions

Flows at LA River at Wardlow (1988 to 2000)





# Deriving a Numeric Target

- ✧ CTR limits for dissolved metals
- ✧ Chronic vs. Acute
- ✧ CTR limits differ for fresh and salt water
- ✧ Freshwater CTR limits a function of hardness
  - CTR default hardness is 100 mg/L
  - CTR limits increase with hardness, up to 400 mg/L



# Dry-Weather Reach Specific Hardness: (mg/L Calcium Carbonate)

River Reach	10 <sup>th</sup> Percentile	Median	90 <sup>th</sup> Percentile
LA River Reach 5. Above Tillman LAR-9	608	702	832
LA River Reach 4. Below Tillman LAR-7,8	196	246	400
LA River Reach 3. Above Glendale LAG-7	232	282	330
LA River Reach 3. Below Glendale LAG-4,5	242	278	322
Western Channel Above Burbank (Station 1)	272	326	395
Western Channel Below Burbank (Station 1.5, 2 and 5)	197	229	275
LA River Reach 2	221	268	322
Rio Hondo Reach 1	111	141	199
LA River Reach 1	219	282	340
Compton Creek	148	225	296
Monrovia	182	209	239 <sup>8</sup>



# Dry Weather Numeric Targets

(ug/L dissolved metals)

	Cadmium (chronic)	Copper (chronic)	Lead (chronic)	Zinc (acute)
LA Reach 5	6.2	29	11	379
LA Reach 4 and Tujunga Wash	4.3	19	6.6	207
LA Reach 3 (above LAG WRP)	4.8	22	7.6	239
LA Reach 3 (below LAG WRP)	4.8	21	7.5	248
Burbank (above Burbank WTP)	5.4	25	8.9	274
Burbank (below Burbank WTP)	4.1	18	6.1	208
LA Reach 2 and Arroyo Seco	4.7	21	7.3	229
LA Reach 1	4.8	22	7.6	228
Compton Creek	4.1	18	6.0	233
Rio Hondo	2.9	12	3.7	128
Monrovia Canyon Creek	3.9	17	5.6	195



# Deriving a Concentration Based Waste Load Allocation from CTR

- ✂ Converting dissolved metals to total
- ✂ CTR default translators
- ✂ Linear regression of total vs. dissolved
- ✂ City of L.A./Larry Walker & Associates  
Modified Copper Translator



# Dry-Weather Concentration-Based Waste Load Allocations

(ug/L Total Metals)

<b>River Reach</b>	<b>Cd</b>	<b>Cu</b>	<b>Pb</b>	<b>Zn</b>
LA Reach 5, 6 and Bell Creek	<b>6.6</b>	<b>30</b>	<b>13.9</b>	<b>387</b>
LA Reach 4 and Tujunga Wash	<b>4.6</b>	<b>21</b>	<b>8.4</b>	<b>211</b>
LA Reach 3 Above LAG WRP	<b>5.1</b>	<b>23</b>	<b>9.6</b>	<b>244</b>
LA Reach 3 below LAG WRP	<b>5.1</b>	<b>24</b>	<b>9.5</b>	<b>253</b>
Burbank (above Burbank WTP)	<b>5.7</b>	<b>26</b>	<b>11.3</b>	<b>280</b>
Burbank (below Burbank WTP)	<b>4.4</b>	<b>19</b>	<b>7.7</b>	<b>212</b>
LA Reach 2 and Arroyo Seco	<b>5.0</b>	<b>22</b>	<b>9.2</b>	<b>234</b>
LA Reach 1	<b>5.1</b>	<b>23</b>	<b>9.6</b>	<b>233</b>
Compton Creek	<b>4.4</b>	<b>19</b>	<b>7.6</b>	<b>238</b>
Rio Hondo	<b>3.1</b>	<b>13</b>	<b>4.7</b>	<b>131</b>
Monrovia Canyon Creek	<b>4.1</b>	<b>18</b>	<b>7.1</b>	<b>199</b>



# Source Assessment

## ❧ Point Sources

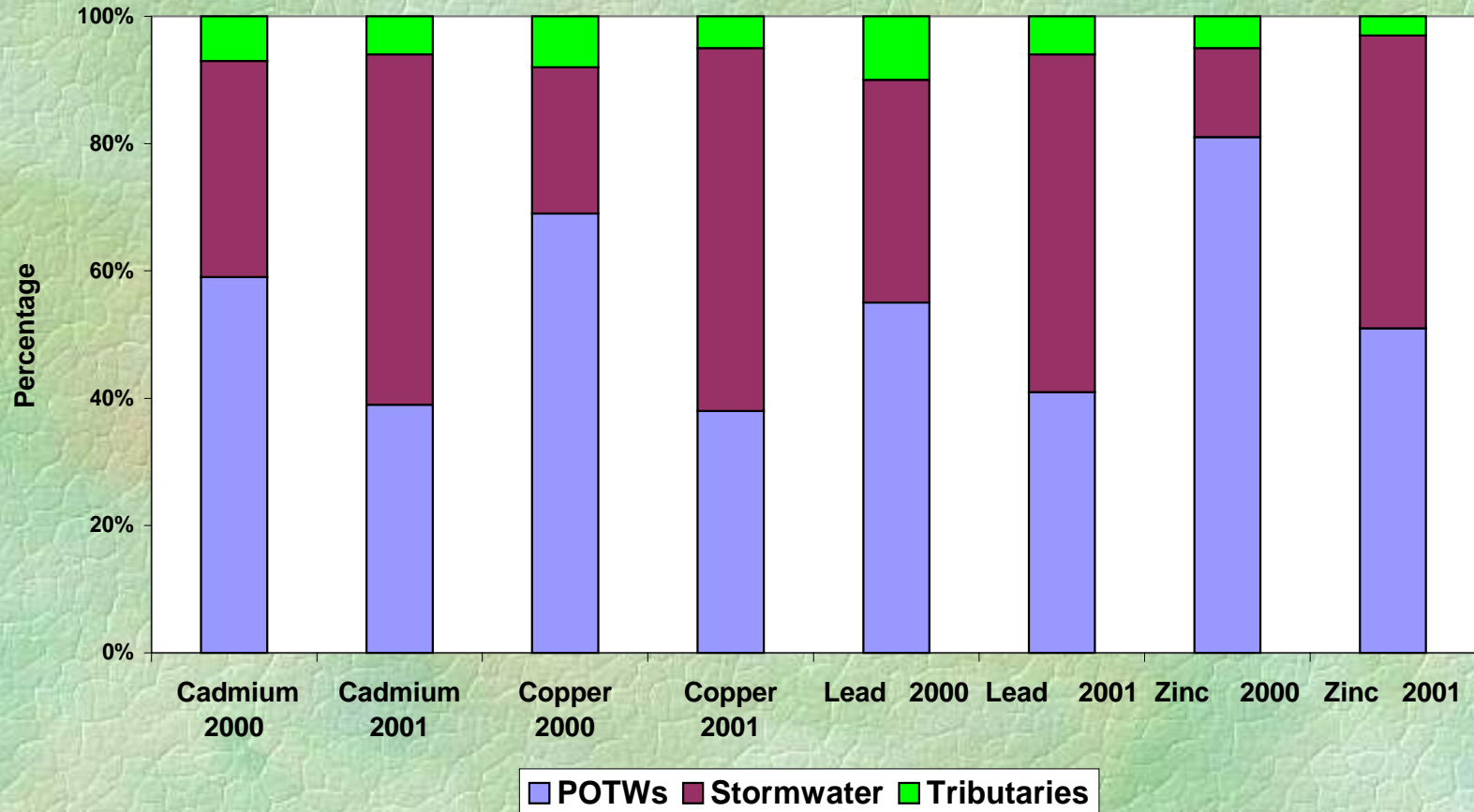
- 6 POTWs
- 3 MS4 permits
- 33 Minor NPDES permits
- ~ 1300 Industrial Stormwater permits
- ~ 200 Construction Stormwater permits
- ~ 100 General NPDES permits

## ❧ Non-point Sources

- Inputs from natural sources treated as background
- Direct atmospheric deposition small



**Source assessment. Dry-weather loadings  
from synoptic surveys (Sept 2000 and July 2001).**





# Dry-weather Waste Load Allocations (kg/d)

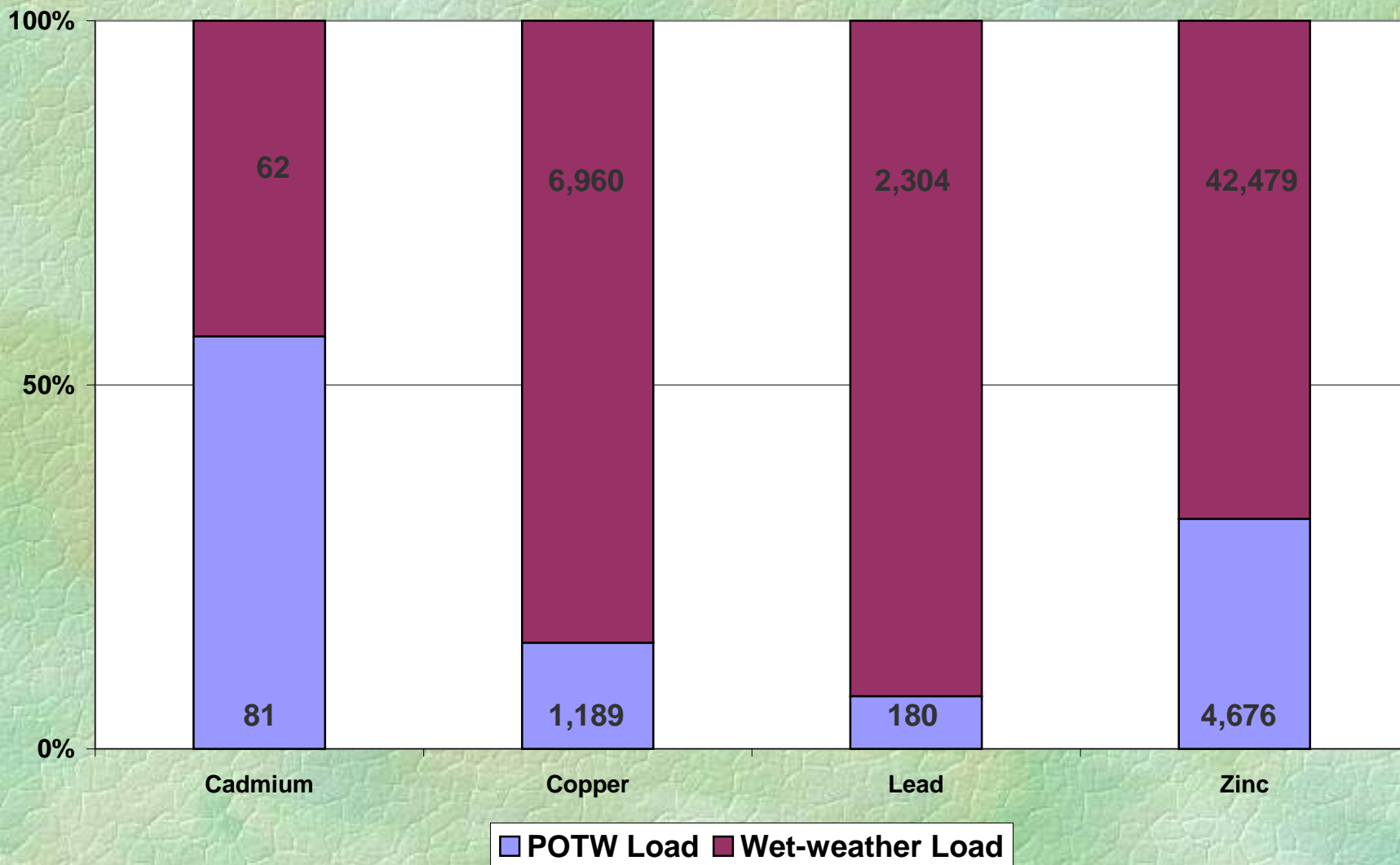
	Cadmium	Copper	Lead	Zinc
Allowable Load (targets x critical flow)	1.6	7.1	2.5	80
Allocation for POTWs (~75% of critical flow)	1.2	5.2	1.8	58
Allocation for other NPDES (~25% of critical flow)	0.4	1.9	0.7	22
Is there a problem with the proposed POTW permit limits in the TMDL?				
Proposed POTW permits (permit limits x design flow)	1.6	7.3	2.0	51
Estimate of existing loads (performance 1998-2002)	0.2	4.5	0.5	13



# POTW Waste Load Allocations Expressed as Permit Limits

Facility	Avg period	Cd	Cu	Pb	Zn
Tillman	30-day	4 µg/l	18 µg/l	5 µg/l	103 µg/l
	Mass	1.2 kg/d	5.4 kg/d	1.5 kg/d	31.2 kg/d
	Daily	7 µg/l	27 µg/l	12 µg/l	207 µg/l
	Mass	2.1 kg/d	8.1 kg/d	3.6 kg/d	62.7 kg/d
Glendale	30-day	4 µg/l	19 µg/l	5 µg/l	187 µg/l
	Mass	0.3 kg/d	1.4 kg/d	0.4 kg/d	14.2 kg/d
	Daily	8 µg/l	35 µg/l	14 µg/l	247 µg/l
	Mass	0.6 kg/d	2.6 kg/d	1.1 kg/d	18.7 kg/d
Burbank	30-day	3 µg/l	12 µg/l	4 µg/l	156 µg/l
	Mass	0.1 kg/d	0.4 kg/d	0.1 kg/d	5.3 kg/d
	Daily	8	26 µg/l	11 µg/l	207 µg/l
	Mass	0.3 kg/d	0.9 kg/d	0.4 kg/d	7.1 kg/d

## Annual metals loadings (kg/year) POTW vs Wet-Weather





# Setting Wet Weather Numeric Based on Hardness Values at Wardlow

<b>Metal</b>	<b>10<sup>th</sup> percentile hardness (34 mg/L)</b>	<b>50<sup>th</sup> percentile hardness (80 mg/L)</b>	<b>90<sup>th</sup> percentile hardness (126 mg/L)</b>
<b>Cadmium</b>	<b>1</b>	<b>3</b>	<b>6</b>
<b>Copper</b>	<b>5</b>	<b>11</b>	<b>17</b>
<b>Lead</b>	<b>20</b>	<b>51</b>	<b>83</b>
<b>Zinc</b>	<b>47</b>	<b>97</b>	<b>143</b>



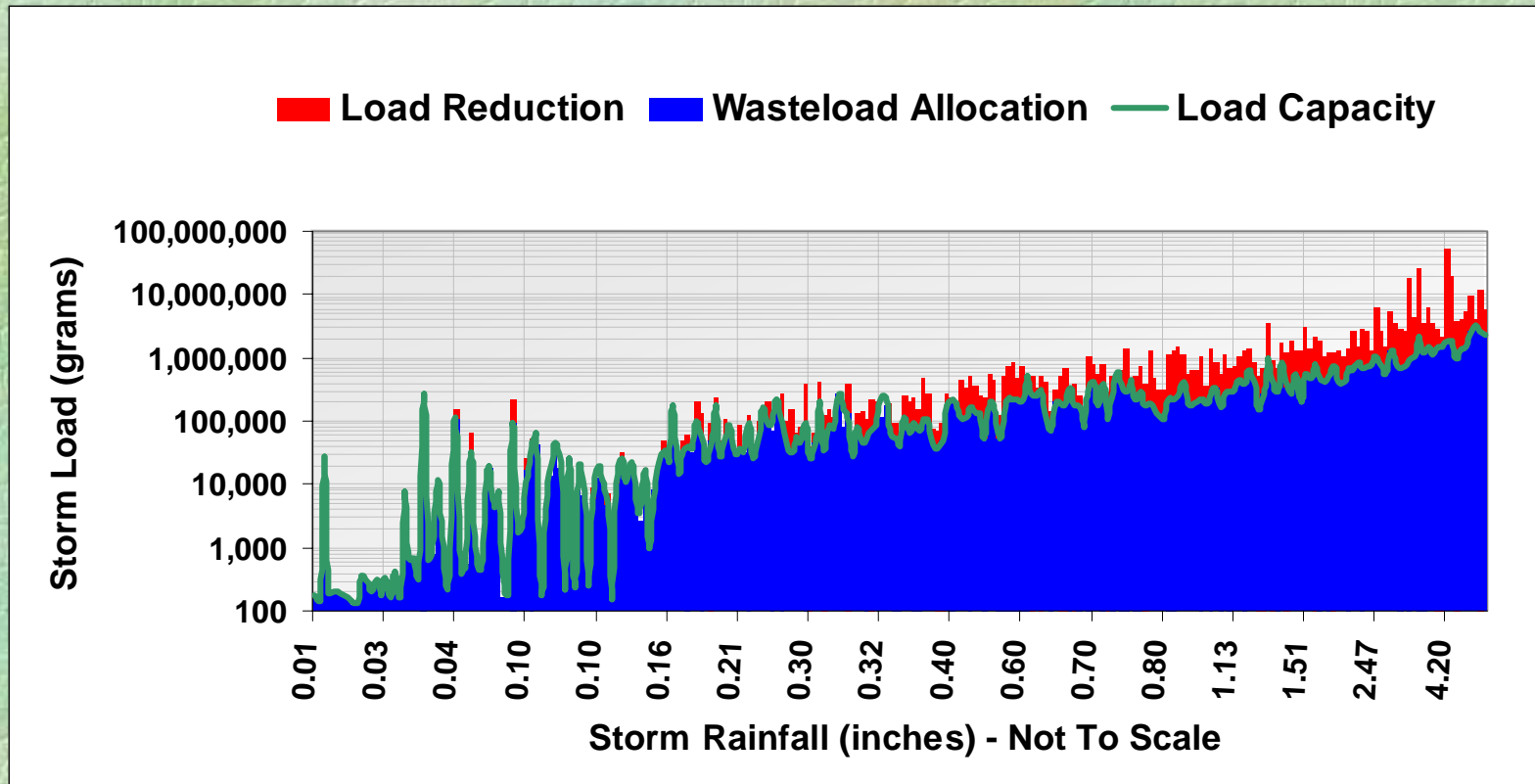
# Wet-Weather WLAs

- ❧ Expressed as Load Duration Curves
- ❧ Load Duration Curves based on volume of rainfall during a rainfall event
  - Provides information on the amount of rainfall to design BMPs
- ❧ Model estimates loading capacity and historic loads

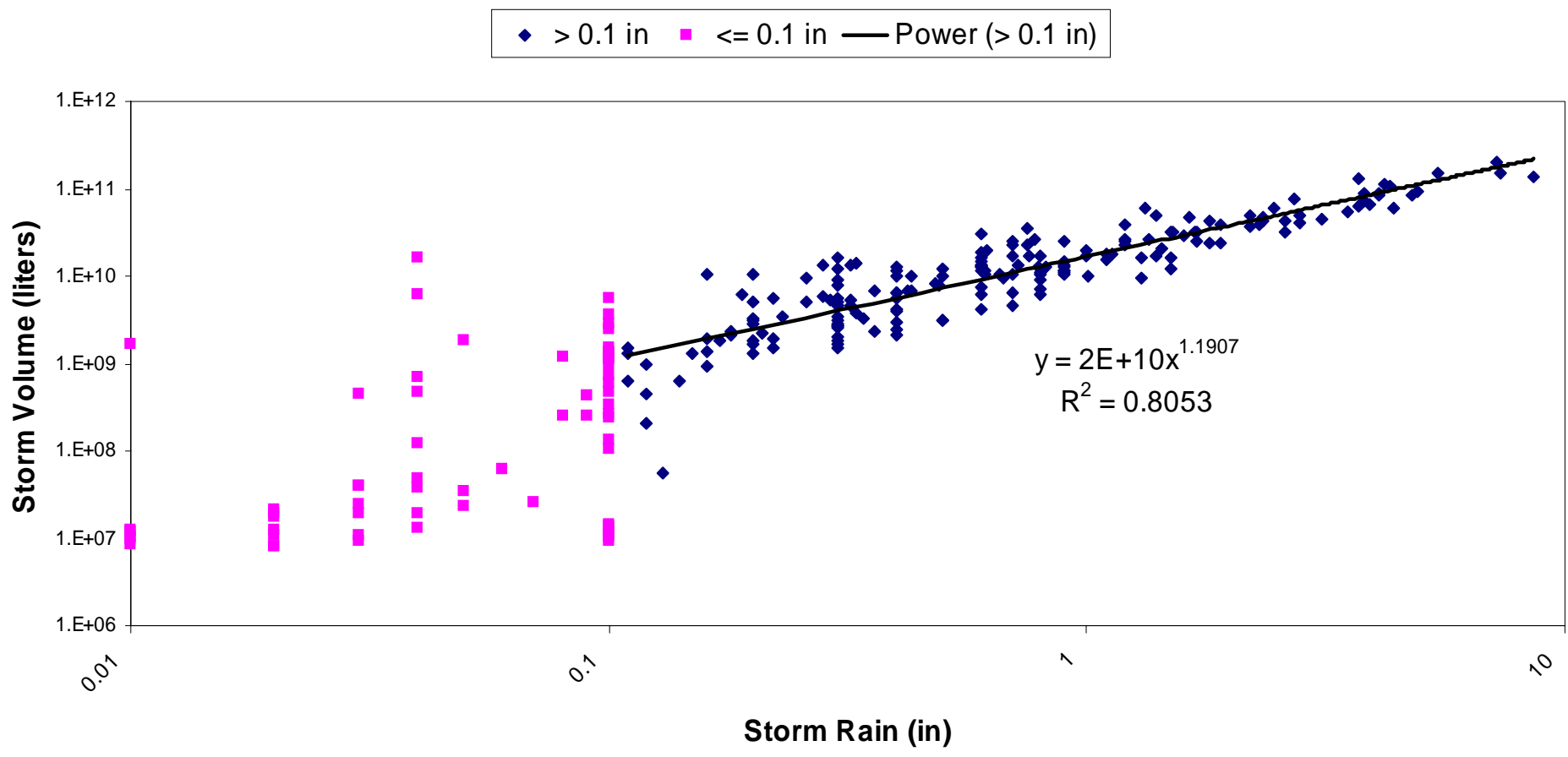


# Load-duration curve for copper as presented in draft TMDL

## Storm Rainfall vs. Storm Load

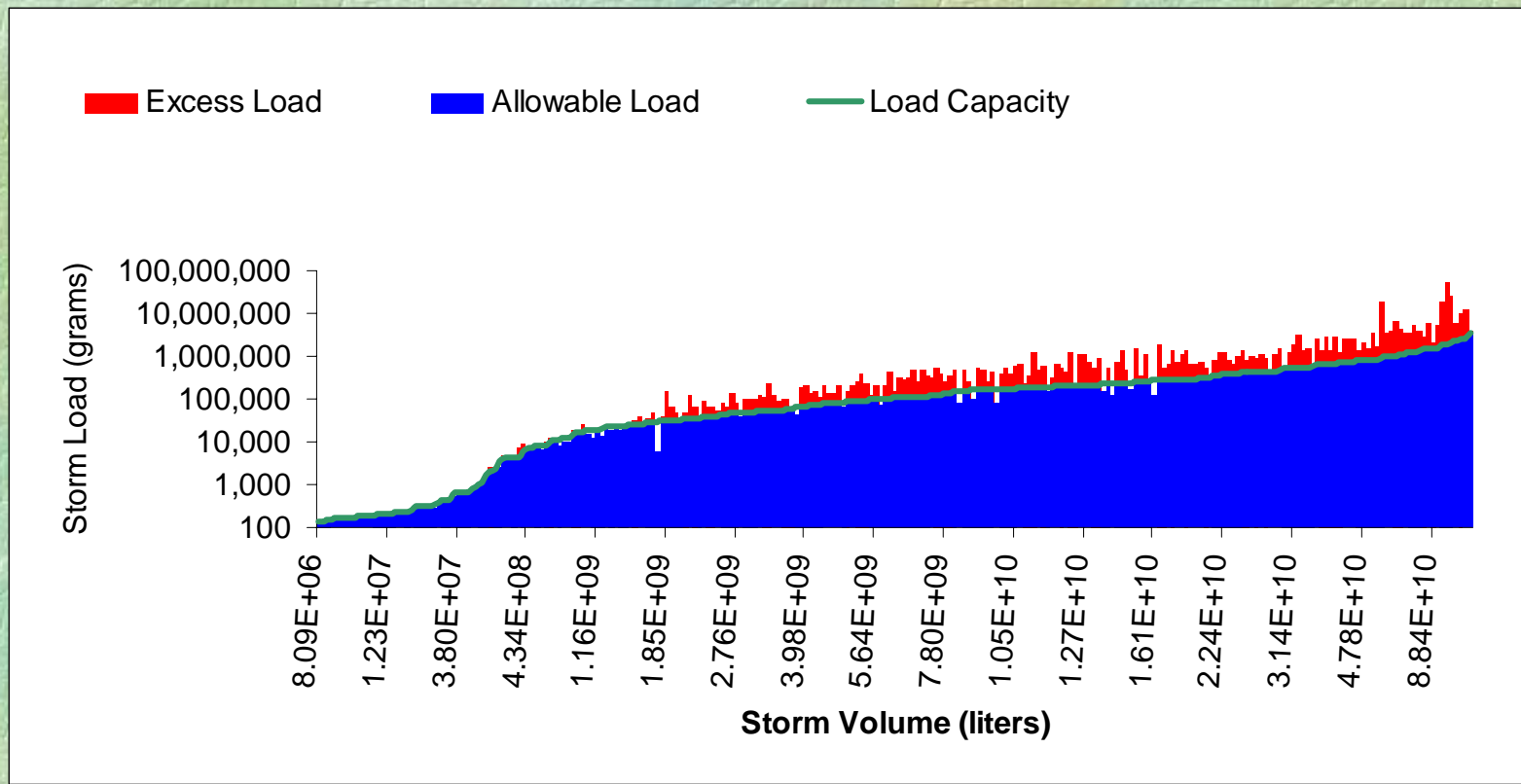


# Relating storm volume to rain fall





# Calculating Load Reductions on a per Storm Basis



# Source Assessment: Conclusions

## ☞ Dry Weather

- POTWs account for large percentage of flow and loading
- Storm drains also contribute large percentage of loading

## ☞ Wet Weather

- Accounts for most of the annual metals loadings
- Stormwater accounts for majority of flow and loading



# Implementation

## ❧ Source Reduction

- Legislation to phase out copper in automotive breaks

## ❧ IRP

- Which areas within watershed to be covered

## ❧ Structural and Non-structural BMPs

- Improved street sweeping technology
- Structural BMPs to remove sediment

## ❧ Evaluate Pre-treatment programs at POTWs



# Implementation for POTWs and NPDES Permits other than MS4

- ✿ Permit limits based on Waste Load Allocations to be incorporated into permits during next permit cycle
  - POTWs, major and minors already subject to CTR requirements
  - Stormwater permits may interpret waste load allocations in terms of Best Management Practices
  - Compliance schedules may allow up to 5 years within permit cycle



# Questions

## ☞ Staff contacts:

- Melinda Becker  
(213) 576-6681  
mbecker @rb4.swrcb.ca.gov
- Jenny Newman  
(213) 576-6808  
jnewman@rb4.swrcb.ca.gov